

Problem 4

- a) The document request was `http://gaia.cs.umass.edu/cs453/index.html`. The Host : field indicates the server's name and `/cs453/index.html` indicates the file name.
- b) The browser is running HTTP version 1.1, as indicated just before the first `<cr><lf>` pair.
- c) The browser is requesting a persistent connection, as indicated by the Connection: keep-alive.
- d) This is a trick question. This information is not contained in an HTTP message anywhere. So there is no way to tell this from looking at the exchange of HTTP messages alone. One would need information from the IP datagrams (that carried the TCP segment that carried the HTTP GET request) to answer this question.
- e) Mozilla/5.0. The browser type information is needed by the server to send different versions of the same object to different types of browsers.

Problem 5

- a) The status code of 200 and the phrase OK indicate that the server was able to locate the document successfully. The reply was provided on Tuesday, 07 Mar 2008 12:39:45 Greenwich Mean Time.
- b) The document `index.html` was last modified on Saturday 10 Dec 2005 18:27:46 GMT.
- c) There are 3874 bytes in the document being returned.
- d) The first five bytes of the returned document are : `<!doc`. The server agreed to a persistent connection, as indicated by the Connection: Keep-Alive field

Problem 22

For calculating the minimum distribution time for client-server distribution, we use the following formula:

$$D_{cs} = \max \{NF/u_s, F/d_{min}\}$$

Similarly, for calculating the minimum distribution time for P2P distribution, we use the following formula:

$$D_{P2P} = \max \{F/u_s, F/d_{min}, NF/(u_s + \sum_{i=1}^N u_i)\}$$

Where, $F = 15 \text{ Gbits} = 15 * 1024 \text{ Mbits}$
 $u_s = 30 \text{ Mbps}$

$$d_{min} = d_i = 2 \text{ Mbps}$$